

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,845,175 B2
APPLICATION NO. : 09/830264
DATED : January 18, 2005
INVENTOR(S) : Avi Kopeloman et al.

Page 1 of 11

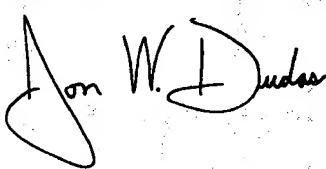
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Delete the title page and substitute therefore the attached title page.

Delete Drawing Sheets 1-11 and substitute therefore the attached Drawing Sheets 1-9.

Signed and Sealed this

Twenty-first Day of August, 2007



A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is fluid and cursive, with "Jon" on the left and "W. Dudas" on the right.

JON W. DUDAS
Director of the United States Patent and Trademark Office

(12) United States Patent
Kopelman et al.(10) Patent No.: US 6,845,175 B2
(45) Date of Patent: Jan. 18, 2005(54) DENTAL IMAGE PROCESSING METHOD
AND SYSTEM

5,278,756 A	1/1994	Leinches et al.
5,318,441 A	6/1994	Koller
6,068,482 A	5/2000	Snow
6,081,739 A	6/2000	Leinches

433/68
433/223
600/407

(75) Inventors: Avi Kopelman, Tel Aviv (IL); Eldad Toub, Reut (IL)

(73) Assignee: Cadent Ltd., Or Yehuda (IL)

DE	4141311	8/1993
EP	0488987	6/1992
EP	0741994	11/1996
JP	4-336048	11/1992
WO	97/03622	2/1997
WO	01/80761 A2	11/2001

(21) Appl. No.: 09/830,264

FOREIGN PATENT DOCUMENTS

(22) Filed: Apr. 23, 2001

(65) Prior Publication Data

US 2003/0169913 A1 Sep. 11, 2003

Related U.S. Application Data

(63) Continuation of application No. PCT/IL99/00577, filed on Nov. 1, 1999.

(30) Foreign Application Priority Data

Nov. 1, 1998 (IL) 126838

(51) Int. Cl. 7 G06K 9/00

(52) U.S. Cl. 382/154; 382/294; 128/922

(58) Field of Search 382/128, 131, 382/154, 285, 294; 600/587, 589, 590; 128/922; 433/24, 29, 68, 69, 215

(56) References Cited

U.S. PATENT DOCUMENTS

5,151,856 A 9/1992 Halman et al.

OTHER PUBLICATIONS

International Search Report for International Application No. PCT/IL99/00577, mailed on Feb. 17, 2000.

An English language title and abstract is provided for DE 4141311.

* cited by examiner

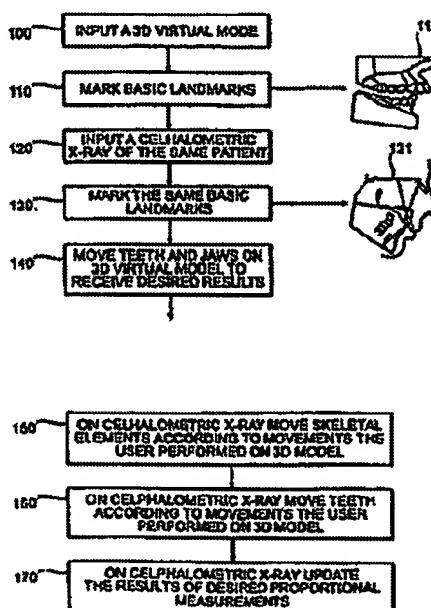
Primary Examiner—Todd E. Manahan

(74) Attorney, Agent, or Firm—Nath & Associates PLLC; Gary M. Nath; Lee C. Heiman

(57) ABSTRACT

An image processing method for use in dentistry or orthodontic is provided. Two images of teeth, one being a two-dimensional image and one a three-dimensional image are combined in a manner to allow the use of information obtained from one to the other. In order to combine the two images a set of basic landmarks is defined in one, identified in the other and then the two images are registered.

23 Claims, 9 Drawing Sheets



U.S. Patent

Jan. 18, 2005

Sheet 1 of 9

6,845,175 B2

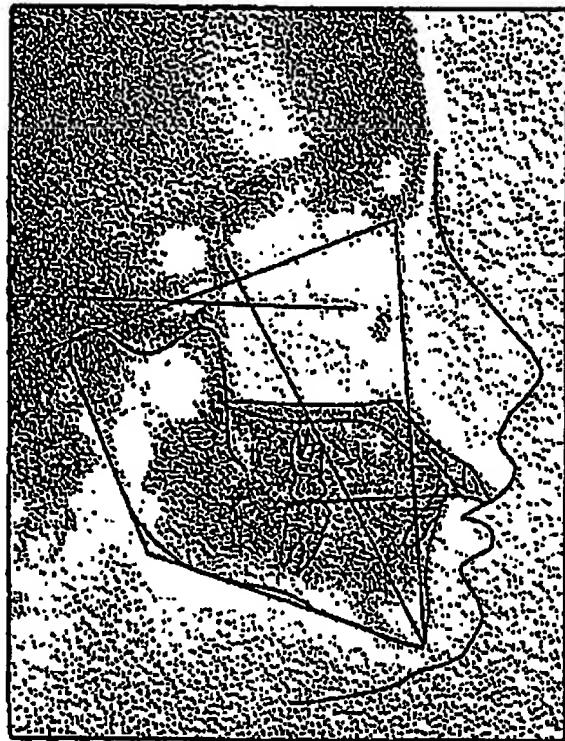


FIG. 1A

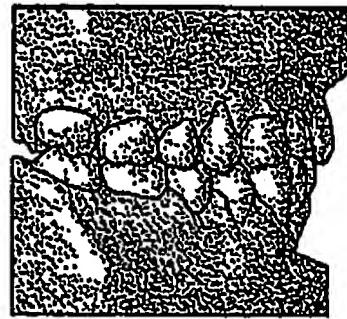


FIG. 1B
PRIOR ART

U.S. Patent

Jan. 18, 2005

Sheet 2 of 9

6,845,175 B2

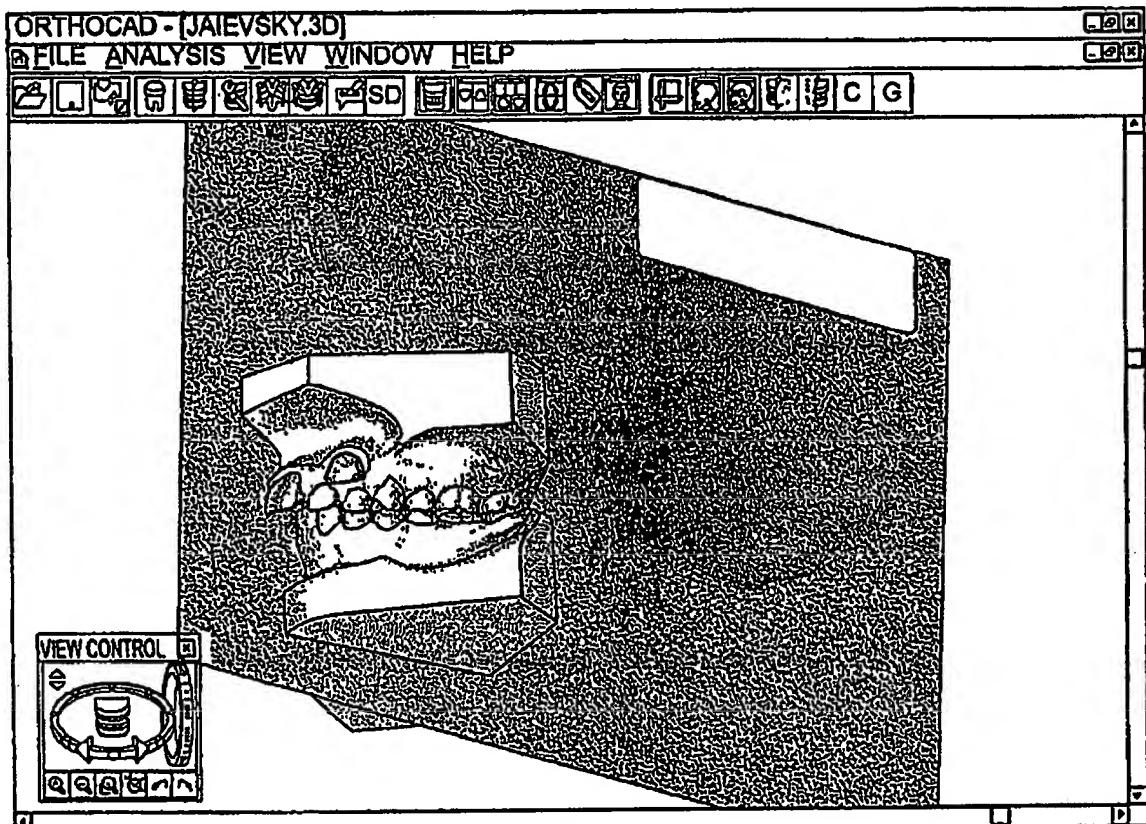


FIG. 2

U.S. Patent

Jan. 18, 2005

Sheet 3 of 9

6,845,175 B2

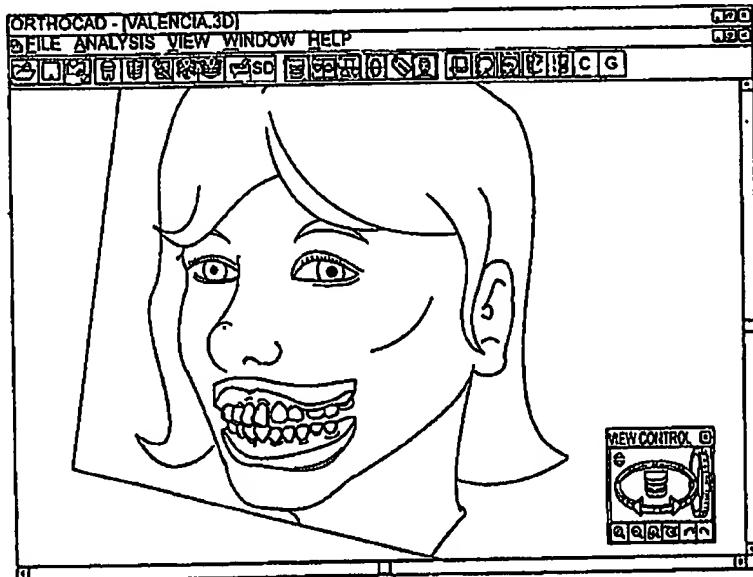


FIG. 3A

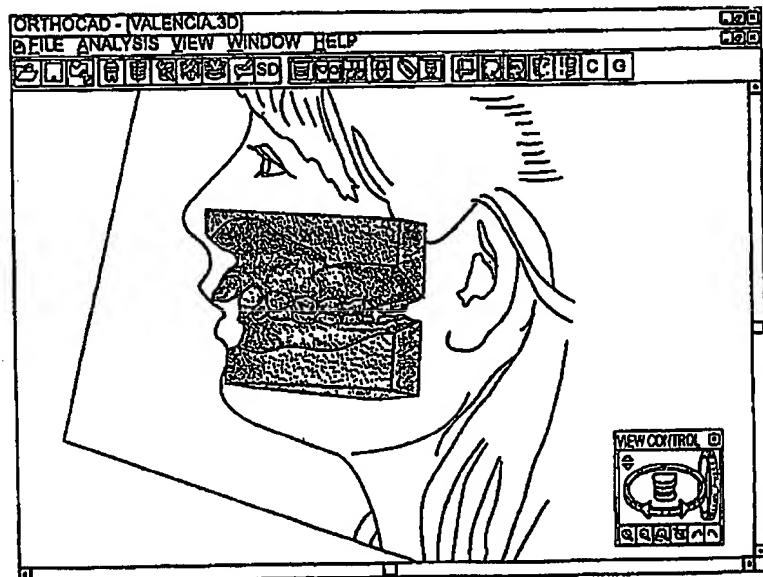


FIG. 3B

U.S. Patent

Jan. 18, 2005

Sheet 4 of 9

6,845,175 B2

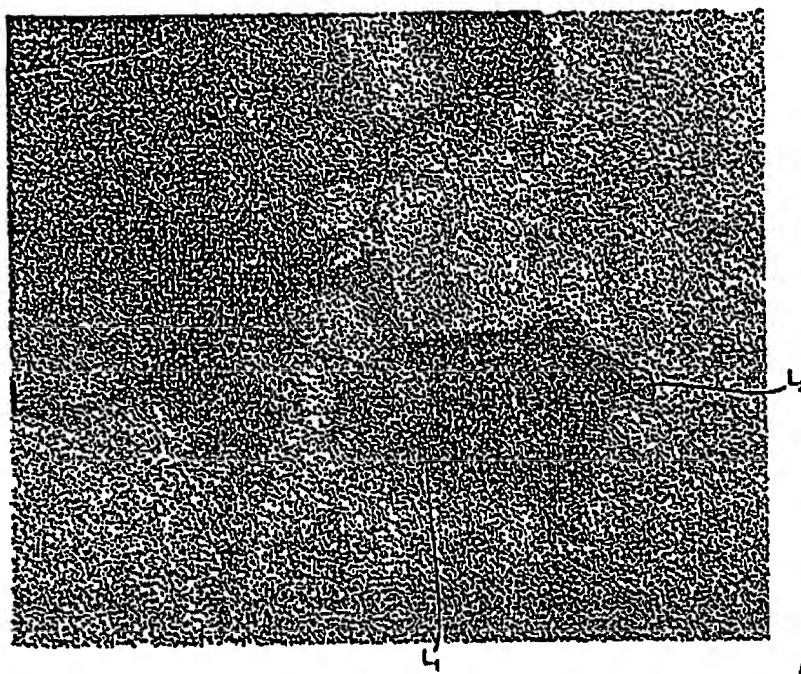


FIG. 4A

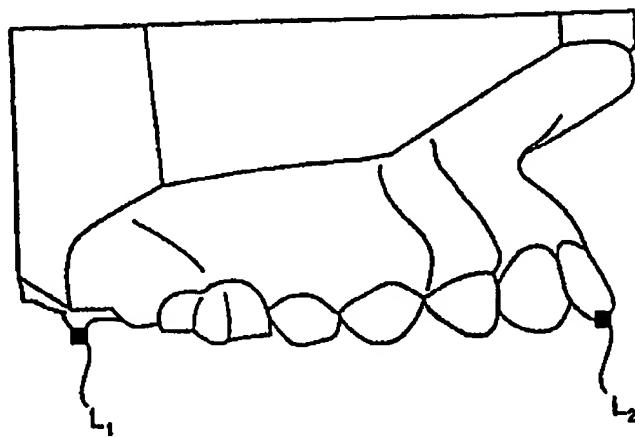


FIG. 4B

U.S. Patent

Jan. 18, 2005

Sheet 5 of 9

6,845,175 B2

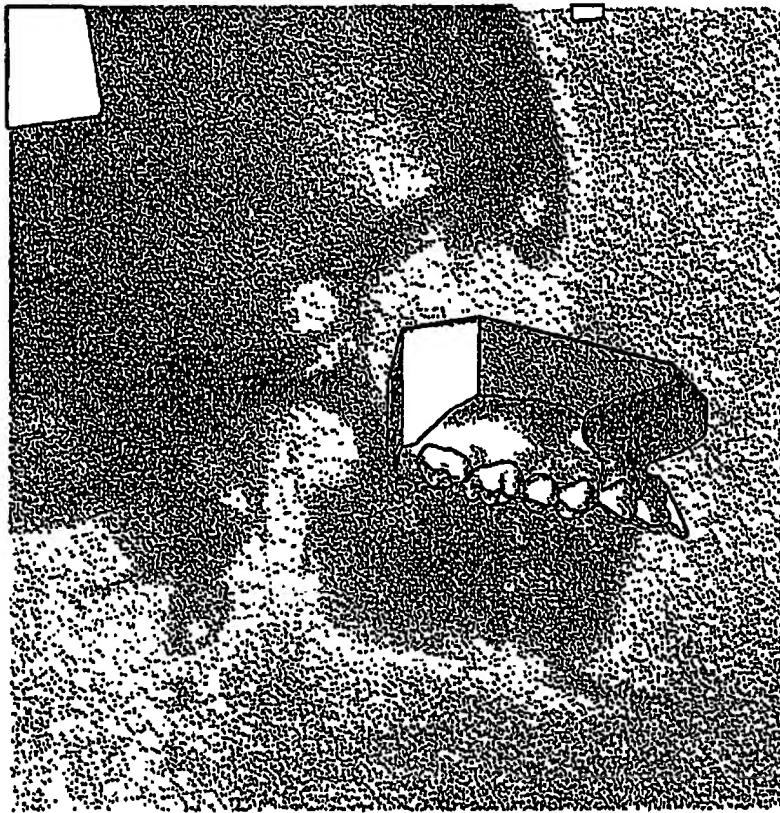


FIG. 5

U.S. Patent

Jan. 18, 2005

Sheet 6 of 9

6,845,175 B2

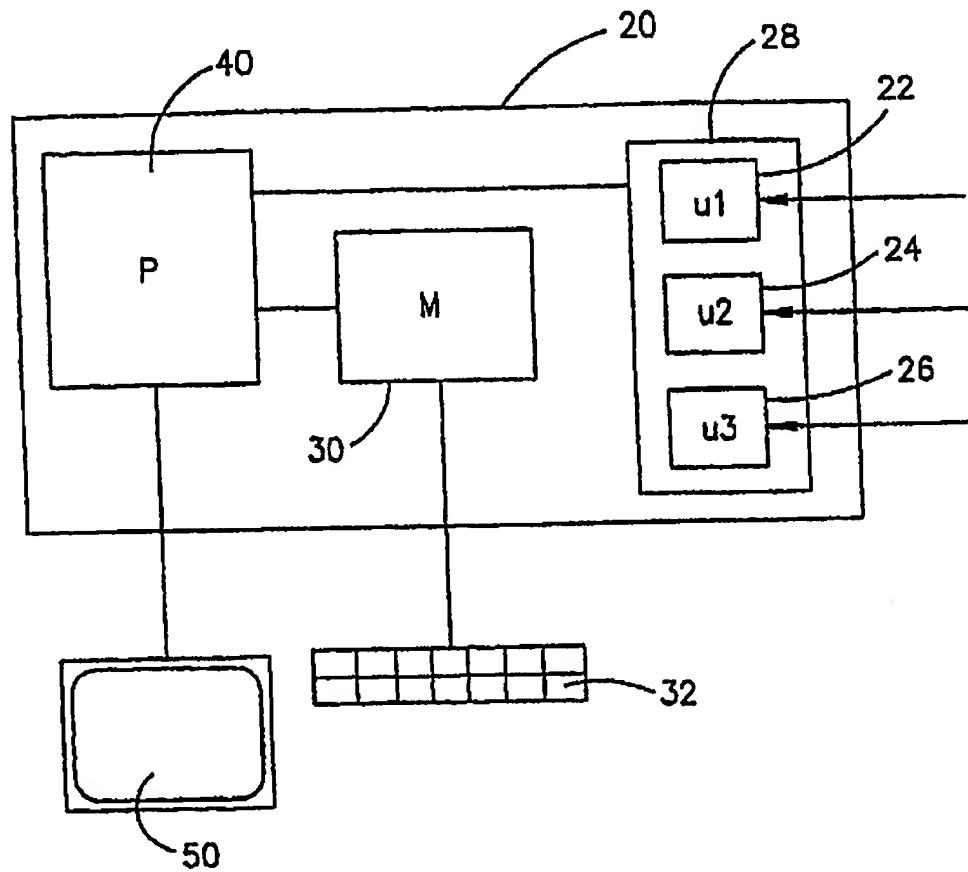


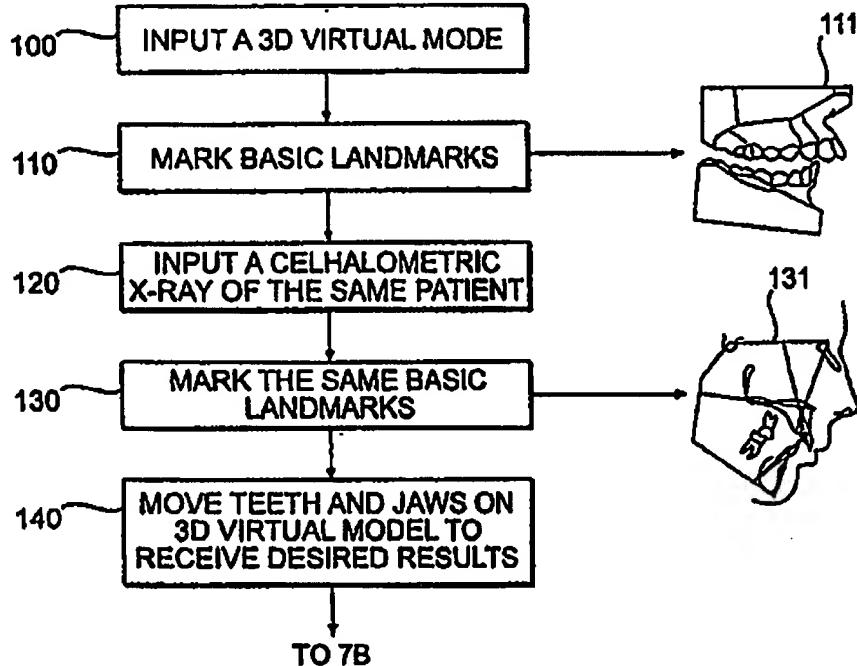
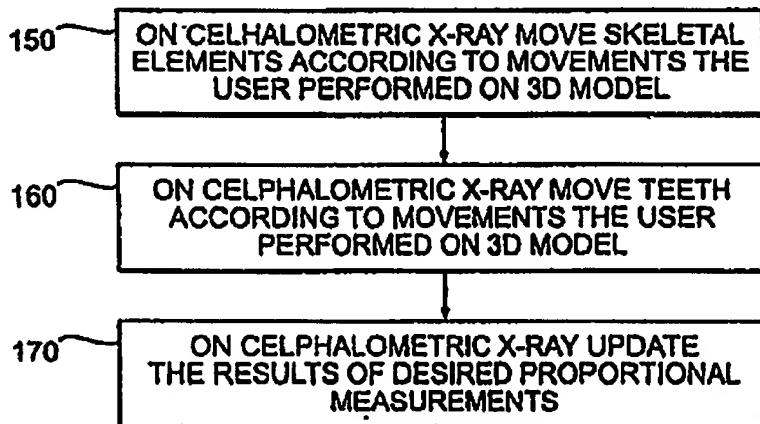
FIG.6

U.S. Patent

Jan. 18, 2005

Sheet 7 of 9

6,845,175 B2

**FIG. 7A****FIG. 7B**

U.S. Patent

Jan. 18, 2005

Sheet 8 of 9

6,845,175 B2

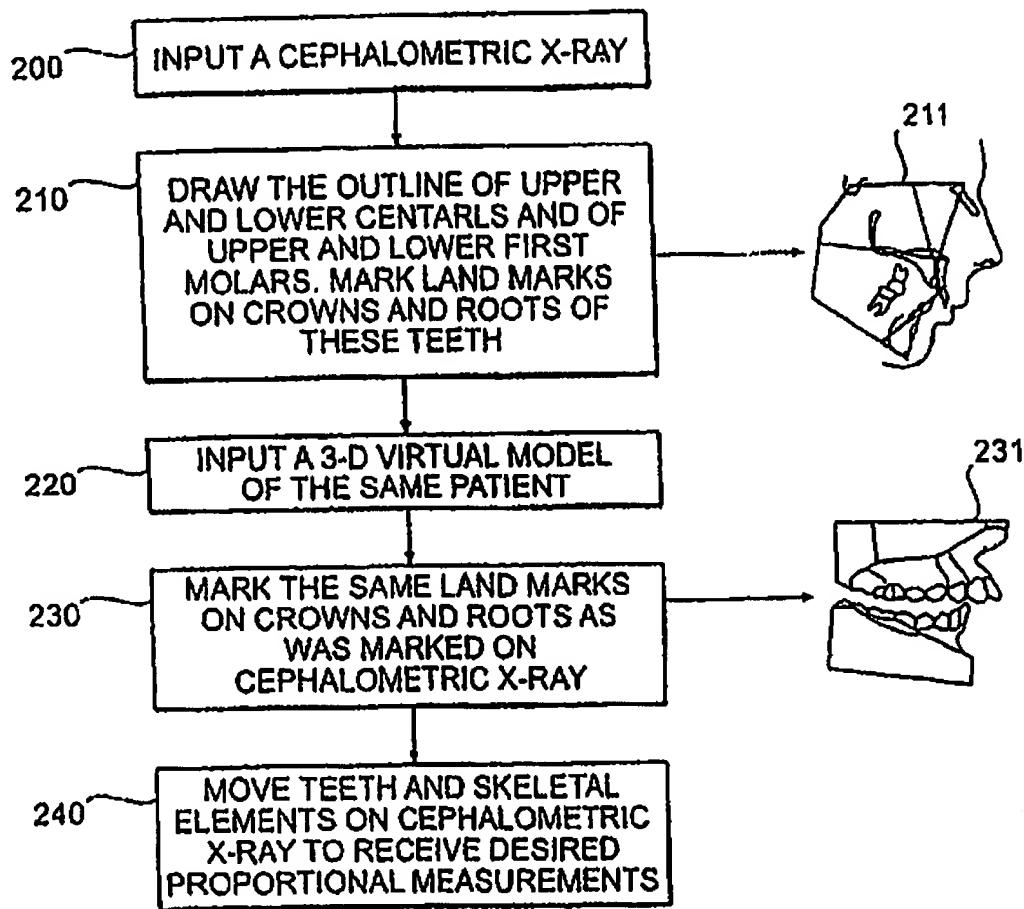


FIG. 8A

U.S. Patent

Jan. 18, 2005

Sheet 9 of 9

6,845,175 B2

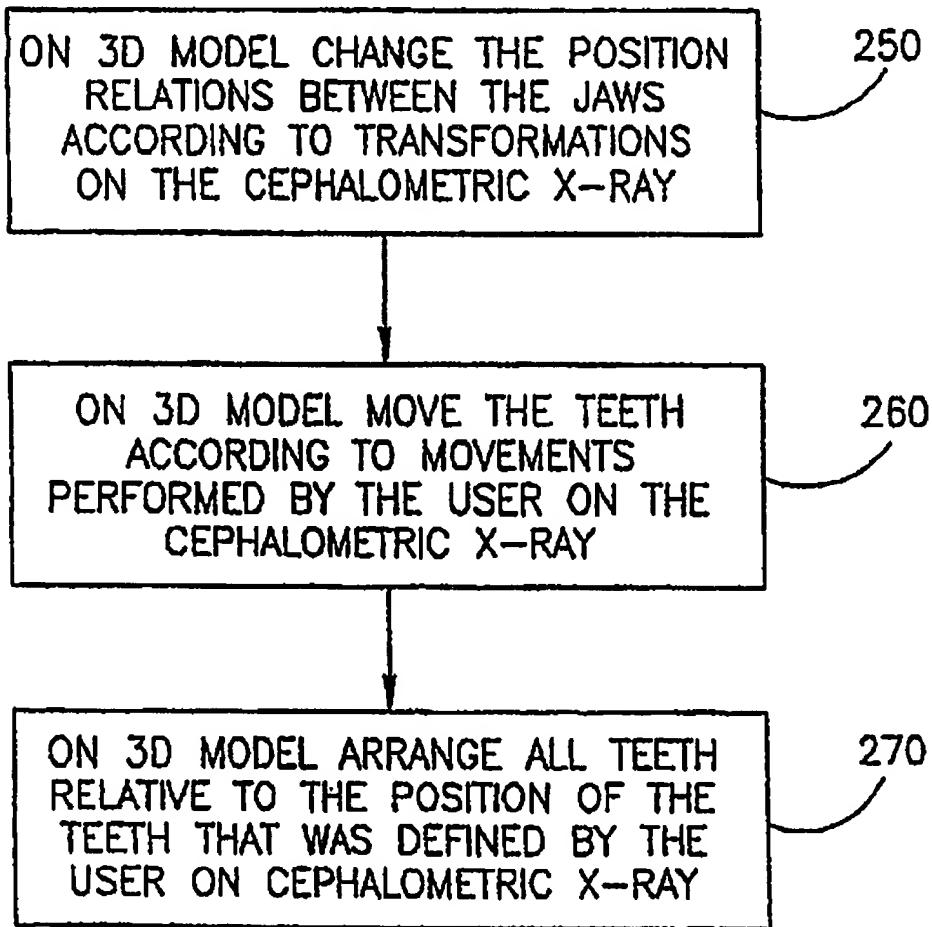


FIG.8B